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# Intergenerational and interethnic mental health: An analysis for the United Kingdom

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## Abstract

This paper uses a nationally representative data set to examine the extent to which family migration history helps explain interethnic variations in mental health in the United Kingdom. We confirm that there is significant variation in mental health across ethnic group and generation of migration. Furthermore, we show how these dimensions interact. The analysis explores the extent to which neighbourhood, personal characteristics, and migration experience are related to mental health. We find evidence that all are important. Our results are consistent with a dynamic view of migration and settlement whereby individuals' circumstances and how they might contribute to mental health change over time and across generations.

## KEYWORDS

ethnic group, immigration, mental health

## 1 | INTRODUCTION

Poor mental health is a widespread problem. At least one third of all families in England include someone who is currently mentally ill (The Centre for Economic Performance's Mental Health Policy Group, 2012). In addition to personal costs, poor mental health has a negative impact on public finances and on the economy (Layard, 2013).

A large literature has grown to examine various determinants of mental health, focusing on economic, social, and personal influences (Layard, Clark, Cornaglia, Powdthavee, & Vernoit, 2014). Age and income have received particular attention (Gardner & Oswald, 2007), but the increased richness of data has more recently allowed the dynamics of mental health to be considered (Clark, 2014; Clark & Georgellis, 2013), as well as life-cycle (Berner, Cornaglia, & De Neve, 2012), and childhood experience effects (Frijters, Johnston, & Shields, 2014; Layard et al., 2014; Powdthavee, 2012). The conclusion from these studies is that mental health is determined by a combination of adult outcomes, family background, and childhood development.

In recent decades, the U.K. population has been characterised by increasing immigration and, partially as a result of this, has become more

ethnically diverse. In view of this, the ethnic and migrant dimensions of mental health are both relevant and intertwined. Both premigration and postmigration experiences have been recognised to play an important role in shaping the mental health of migrants (Arévalo, Tucker, & Falcón, 2015). Understanding the relationship of migration and ethnicity to mental health is important for policy if preventative health strategies are to target population groups most in need. Moreover, because mental health can be associated with severe limitation of economic and social functioning (Johnston, Schurer, & Shields, 2011), being able to intervene effectively has the potential to improve social and economic integration of ethnic groups of different migrant generations.

In this paper, we explore how mental health varies by ethnicity and migrant generation. We use the Understanding Society data that have an ethnic minority booster sample and therefore provide sufficient numbers of observations to allow these dimensions to be considered.

We consider three aspects of mental health, all constructed from the General Health Questionnaire (GHQ). These are anxiety and depression, social dysfunction, and loss of confidence. Another distinctive feature of our analysis is that we distinguish between first-generation migrants, second-generation migrants, and "natives," a shorthand for

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those born in the United Kingdom and with both parents also born in the United Kingdom. We further distinguish first-generation migrants between “recent” and “established” migrants, according to whether or not they arrived in the United Kingdom within the last 10 years.

Our analysis examines ethnic and migrant variations in mental health. We use regression analysis to assess whether significant ethnic variation exists after controlling for migrant generation and, likewise, whether significant variation by migrant generation exists after controlling for ethnic group. Our results allow us to see the interaction between ethnic and migrant variations. Furthermore, we include additional variables into our regression analysis to examine the extent to which factors relating to migration experience appear to be related to individuals' mental health. We use multilevel regression to allow for spatial clustering (within local authority districts).

Our results document heterogeneity in mental health across ethnic group and migrant generation. Pakistanis stand out as most likely to suffer poor mental health. With regard to variations by migration history, we find that recent migrants experience better mental health, on average, than White natives. The ethnic and migration dimensions interact, resulting in a rich pattern of results. We explore some of the reasons behind this and find that neighbourhood diversity is associated with better mental health for both second-generation minorities and recent minority migrants. For this latter group, living in areas where one's own ethnic group is well represented is also associated with improved mental health. Moreover, the analysis of migration experience shows that the mental health of first-generation migrants declines and converges to that of natives the longer migrants stay in the host country. Furthermore, although mother tongue and language spoken in childhood does not seem to affect mental health of first-generation migrants, speaking a language other than English in childhood is associated with worse mental health for second-generation migrants.

This paper is organised as follows. Section 2 reviews the relevant existing literature. Section 3 describes the data. Section 4 presents some descriptive statistics and regression results. Section 5 concludes.

## 2 | EVIDENCE ON HOW MENTAL HEALTH VARIES ACROSS ETHNIC GROUPS AND BY MIGRANT STATUS

Mental health of minority groups can be considered as an indicator of integration and an indicator of the way different ethnic groups assimilate and adjust into the cultural and social life of the largest ethnic group of the U.K. population: White. According to the U.K. census in 2011, Whites represented 87% of the U.K. population.

A recent strand of research has analysed the relationship between migration and health, with a large strand analysing the assimilation of immigrants' health over time, termed *the healthy immigrant effect*, by focusing primarily on physical health and documenting that immigrants are in better health upon arrival in the hosting country than the natives do, although this health advantage erodes over time (Antecol & Bedard, 2006; Giuntella & Stella, 2017).

The healthy immigrant effect with respect to mental health has instead received less attention. Research for Canada (Lou & Beaujot, 2005) indicates that immigrants' mental health status assimilates to

that of the native Canadian population over time; a more recent evidence for Australia (Janisch, 2017) finds that mental health of immigrants deteriorates over time, with that of female immigrants exceeding mental health of natives upon arrival.

Both premigration and postmigration experiences have been recognised to play an important role in shaping the mental health of migrants (Arévalo et al., 2015). Due to the different experiences during the immigration process (Giuntella, Kone, Ruiz, & Vargas-Silva, 2017), the route of entry can explain heterogeneity of health of migrants. Chiswick, Lee, and Miller (2008) show that in Australia, immigrants' self-reported health status varies with visa category, being better among those selected based on their potential for economic success. In a more recent contribution for the United Kingdom, Giuntella et al. (2017) looked at reason for migration and found that immigrants who migrated for employment reasons were less likely to report mental health conditions than natives, whereas those who migrated for asylum reasons were more likely to do so.

Hatzenbuehler et al. (2017) examine the mental health impact of the overall policy climate for Latinos in the United States, suggesting that restrictive immigration policies may be detrimental to the mental health of Latinos in the United States. In a similar vein, Sand and Gruber (2018) examine disparities in subjective well-being among older migrants and natives across several European countries and find that the immigrant-native gap is bigger in countries with restrictive policies and smaller in countries with open policies.

Stillman, Gibson, McKenzie, and Rohorua (2015) use survey data on successful and unsuccessful applicants to a migration lottery to New Zealand to estimate experimentally the impact of international migration on objective, in terms of incomes and expenditures and subjective well-being. Although international migration improves objective well-being, the effects of migration on subjective well-being are complex, with mental health improving but happiness declining.

Analysing the mental health of Puerto Rican immigrants in the United States, Arévalo et al. (2015) document that the association of neighbourhood ethnic density with depressive symptomatology was significantly modified by sex and level of language acculturation, with men, but not women, experiencing protective effects of ethnic density.

Several studies (see, e.g. Chiswick et al., 2008; Arévalo et al., 2015; Janisch, 2017) have highlighted the importance and role of language proficiency in the process of acculturation since this allows immigrants to navigate their environment effectively to locate social and economic resources and may facilitate adaptation to the host society, reducing adaptation-related stress. Additionally, evidence for the United Kingdom has documented that poor English skills lead immigrants to live in areas with a high concentration of people who speak their same native language (Aoki & Santiago, 2018). As pointed out by Chiswick et al. (2008), knowledge of the language of the destination may be relevant for health status, because it would facilitate communication. Language ability has been emphasised in different studies as one of the main determinants of successful integration (Adserà & Ferrer, 2015; Aoki & Santiago, 2018). Language proficiency is considered a vital component of any migrant's integration process because it facilitates mobility, helps to develop social networks, provides a sense of cohesion, and unlocks access to social connections, enhancing assimilation and integration (McAreavey, 2010). In fact, previous

studies (Biddle, Kennedy, & McDonald, 2007) revealed differences in health profiles of immigrants from English-speaking and non-English-speaking countries, which were associated with acculturation or environmental effects.

Analysing different aspects of mental health of migrants is crucial for several reasons. Even when they are from the same ethnic background, migrants may differ from natives and from other migrants of different cohorts. Migrants are a subgroup of their original population with characteristics, culture, tradition, and preferences that differ from those of natives and can vary significantly across countries. For example, distance from home, weather changes, and culture shock can all contribute in different ways to shaping the mental health of migrants. The degree of heterogeneity among migrants may vary with the duration of the migration experience (Simpson, 2013).

Moreover, the integration of minority groups is a complex and long-term process that, across generations, can be hindered or facilitated depending, for example, on personal traits and the motivation of individuals and on the characteristics and (dis)similarities of the country of origin with the hosting one.

Few researchers have considered both the ethnic and migrant dimensions in the analysis of health status. Jayaweera and Quigley (2010) have shown the existence of ethnic variation in health indicators among mothers of infants according to whether they were born in the United Kingdom and, for those who were not, their length of residence. Mothers in minority groups are more likely than White British/Irish mothers to perceive their health as poor and to feel depressed.

Beyond these observed differences, there is the question of why mental health varies. Local area characteristics may be important. In psychiatry, the relationship between mental health and neighbourhood ethnic density has been explored. Under the “ethnic density hypothesis,” individuals may have better mental health when living in areas with a higher proportion of people of the same ethnicity (Shaw et al., 2012). Positive ethnic density effects have been found for suicide-related outcomes for Black people in the United Kingdom (Bécares, Nazroo, Albor, Chandola, & Stafford, 2012). Similarly, a study of Black Caribbean people in the United Kingdom shows that increased Black ethnic density was associated with improved health (Bécares, Nazroo, Jackson, & Heuvelman, 2012). As suggested by Bécares, Nazroo, et al. (2012), ethnic density effects are likely to vary with the reasons for migrating and the length of stay, as well as the socio-economic profiles of ethnic groups and the places where they live.

The aim of this paper is to provide a fuller understanding of how mental health in the United Kingdom varies within migrant generation and ethnic group, by focusing on the differences between and within first- and second-generation migrants. In so doing, we contribute to the existing literature in several ways. First, we analyse three measures of mental health, allowing us to identify which psychological aspect is most affected. Second, we consider how an individual's mental health varies with both the ethnic density of the local population, and what we refer to as “concentration,” the degree to which the individual's own ethnic group is represented in the local population. Third, we jointly consider the role of migration-related characteristics.

As mentioned above, although recent evidence suggests that one of the key aspects of health heterogeneity across migrants is the

reason for immigration (Chiswick et al., 2008 and Giuntella et al., 2017), a key limitation for the current study is that Understanding Society does not provide this information.

### 3 | DATA

Understanding Society is a longitudinal survey of households living in the United Kingdom, in which each adult member of the household is interviewed annually. It has been running since 2009 and is a nationally representative sample of around 30,000 households. It is particularly suited to our use because it incorporates a booster sample of approximately 4,000 households where at least one member (or their parents or grandparents) is from an ethnic minority group, with the intention of achieving at least 1,000 adult interviews from Black African, Bangladeshi, Black Caribbean, Indian, and Pakistani ethnic groups.

In line with this and with most of the existing studies (see Dustmann & Theodoropoulos, 2010), we focus on the six largest ethnic groups defined by the following typology: White, Indian, Pakistani, Bangladeshi, Black Caribbean, and Black African. Mixed and other, representing just below 3.5% of the sample, have also been excluded because they are very heterogeneous groups. Like Longhi (2014) and Knies, Nandi, and Platt (2016), because the measures of diversity are time-invariant, we use Wave 3 only of Understanding Society, with respondents interviewed in 2011 to 2012.

All respondents are asked whether they were born in the United Kingdom and, if not, when they moved to the country. They are also asked about their parents' country of birth. Using this, we categorise each respondent as follows:

- recent (first-generation) immigrant—born outside the United Kingdom, parents both born outside the United Kingdom, lived in the United Kingdom for less than 10 years;
- established (first-generation) immigrant—born outside the United Kingdom, parents both born outside the United Kingdom, lived in the United Kingdom for 10 years or more;
- second-generation immigrant—born in the United Kingdom, parents both born outside the United Kingdom;
- native—Whites only, born in the United Kingdom, parents both born in the United Kingdom.

We use a measure of mental health derived from the 12-item GHQ, a self-administered screening test aimed at detecting psychiatric disorders that require clinical attention among respondents in community and nonpsychiatric clinical settings. The GHQ is used to detect disorders of a temporary nature, such as depression or anxiety, but also permanent conditions such as psychotic depression and schizophrenia. The main advantage of the GHQ is that it does not require a subjective assessment by a specialised clinician (Hauck & Rice, 2004) and allows identification of individuals at higher risk of mental illness. It has been used in a number of studies of mental health (see, e.g., Clark & Georgellis, 2013; Dustmann & Fasani, 2015).

There are 12 GHQ questions in the Understanding Society. All require a response on a scale ranging from 1 to 4, 1 being the best

score. We recode all these indices to range between 0 (*least distressed*) and 3 (*most distressed*). We aggregate the 12 GHQ measures into three broader categories: anxiety and depression, social dysfunction, and loss of confidence (see Table A1 for details).

This disaggregation, first adopted by Graetz (1991), is pretty common in existing studies, and it allows identification of the particular dimensions of respondents' psychology that are affected (Dustmann & Fasani, 2015). Each measure is expressed as the average score across the corresponding GHQ measures.

In addition to the measures of mental health, Understanding Society contains rich demographic information. We use the following as control variables in the regression analysis: age, gender, a dummy for working (as employed or self-employed), a dummy for partnership, number of own children in the household (none, 1 child, 2 or more children), and a dummy for living in London. We also include logged household income, equivalised using the modified OECD equivalence scale to take account of household composition.

Moreover, Understanding Society contains variables that capture migration-related characteristics.

We account for various migration-related characteristics that might affect mental health, distinguishing between first- and second-generation immigrants. Years since migration provide information on the length of stay in the United Kingdom, and age at arrival in the United Kingdom provides information of the stage in life that an individual arrived in the country.

Following existing literature (Biddle et al., 2007; Chiswick et al., 2008; Janisch, 2017), we control for country of birth in order to capture heterogeneity of migrants' countries of origin. Unfortunately, Understanding Society data only collect detailed information of country of birth for the largest groups in the United Kingdom, with 23% of the first-generation immigrants not reporting the country of birth. Groups of the country of birth are defined as follows: Europe includes Cyprus, France, Germany, Ireland, Italy, Poland, and Spain; Asia includes Bangladesh, China/Hong Kong, India, Pakistan, and Sri Lanka; Africa includes Ghana, Kenya, Nigeria, South Africa, and Uganda; Caribbean refers to Jamaica. Due to the small sample, we have grouped together United States, Canada, New Zealand, and Australia. In order to control for the role of English knowledge, we exploit two variables: (a) based on country of birth, we derive a variable for immigrants' mother tongue, specifically deriving a dummy for non-English country immigrants, and (b) we control for language spoken in childhood deriving a dummy for not speaking English in childhood. Language spoken in childhood is likely to be the first language learned and being determined by parents and is also less likely to be affected by self-reported bias (Janisch, 2017). In addition, individuals exposed to a new language during childhood can learn it more easily than those exposed to it outside of this critical period (Aoki & Santiago, 2018). We also construct a dummy for having arrived as a child (aged less than 15) and not speaking English in childhood.

To account for migrant history and characteristics of parents, for the second-generation immigrants, we control for whether an individual spoke English in childhood and if either parent arrived from a non-English-speaking country.

Following the existing literature (Manacorda, Manning, & Wadsworth, 2012; Rienzo, 2014), we also include as a control the

level of education, based on the age at which the person left full-time education. Specifically, individuals are regarded as having a "lower" level of education if they left full-time education at 16 years of age or earlier, "intermediate" if they left education between 17 and 20 years old, and "higher" if they left full-time education when 21 or older.

Understanding Society also provides details on where individuals live. This is at the Local Authority District (LAS-NUTS3) level and allows the data to be linked to the 2011 Census in order to derive two local area measures of ethnic composition.

The first measure is the proportion of the local population who are from a minority ethnic group. Following the terminology in Dorsett (1998), we refer to this as the "density." The second measure is the proportion of the population who are from the respondent's own ethnic group. We refer to this as the "concentration."

We exclude from the sample U.K.-born individuals who report having only one parent born abroad (2,061 observations), any non-White natives (187 observations), and Gypsies or Irish travellers (10 observations). These groups have been excluded because it is difficult to classify them into one of the ethnic/migration categories considered.

## 4 | RESULTS

### 4.1 | Descriptive statistics

The sample is summarised in Table 1a, 1b. As documented in Table 1a, presenting descriptive statistics by ethnic groups,<sup>1</sup> with the exception of Black Caribbeans, minority groups tend to be younger than Whites, with slightly more than half being female. Across all ethnic groups, the majority of respondents are in a partnership, with the percentage being particularly high for Indians, Pakistanis, and Bangladeshis. On average, between 52% and 62% are either employed or self-employed, but fewer than 50% of Pakistanis and Bangladeshis are working. Whites have on average the highest household income, whereas Pakistanis have the lowest. Only about 6% of Whites live in London. Looking at the distribution of each ethnic group across generation, the vast majority of Whites are natives. Between 12% and 43% of minority groups are second-generation immigrants, with most being first-generation immigrants who have been in the country for 10 years or more. The presence of recent immigrants is particularly high among Black Africans and Indians. Minority groups tend to be relatively highly educated and are on average better educated than White people. The only exception is among Bangladeshi and Pakistani who appear to be the least educated. More than 50% of Pakistani and Bangladeshi have at least one child, whereas 70% or more of Caribbean and White respondents do not have any children living with them.

Ethnic minorities also tend to live in much more diverse neighbourhoods than Whites. However, this is not driven by specific ethnic groups being concentrated in particular areas. Whereas Whites live in predominantly white areas on average, individuals from other ethnic groups appear to live in areas that, ethnically, are much more mixed.

**TABLE 1A** Characteristics of individuals by ethnic group

Variable	White	Indian	Pakistani	Bangladeshi	Black Caribbean	Black African
Age	50	43	38	36	51	39
Female (%)	56	51	56	53	61	61
Partner (%)	80	92	91	92	74	84
Working (%)	55	62	44	42	52	55
Household income (£)	2,075	2,041	1,348	1,464	1,791	1,646
London (%)	6	42	21	73	62	67
Generation (col %)						
Natives	95					
2nd generation	1	29	37	31	43	12
1st generation, established	3	51	48	56	54	61
1st generation, recent	1	20	15	13	3	27
Education (col %)						
Lower	45	25	40	46	38	23
Intermediate	31	40	35	36	33	32
Higher	25	38	25	18	30	46
Number of children (col %)						
None	74	59	44	47	70	51
1 child	12	17	15	15	16	16
2 or more children	15	24	41	38	14	32
Concentration index (%)	91	11	9	19	13	13
Density index (%)	9	38	32	47	38	38
Total N	26,195	1,161	924	641	624	775

Note. Based on Wave 3 of Understanding Society and Census 2011.

**TABLE 1B** Migration characteristics

Variable	
A. Immigrant 1st generation	
Years since migration	23
Age at migration	23
Country of birth (col %)	
Europe	14
Asia	42
Africa	13
Australia, New Zealand, Canada, and United States	3
Caribbean	5
Other	23
First language (col %)	
English	21
Non-English	79
Arrived as a child and not speaking English in childhood (%)	13
Total N	3,880
B. Immigrant 2nd generation	
Not speaking English in childhood (%)	42
Either parents arrived from non-English-speaking country (%)	32
Total N	1,571

Note. Based on Wave 3 of Understanding Society.

Table 1b provides information on the migration history of the sub-sample of first- and second-generation immigrants.

On average, first-generation immigrants have been living in the United Kingdom for 23 years and are 23 years old<sup>2</sup>; the vast majority

of them (79%) come from a non-English-speaking country, and 13% arrived as a child from a non-English-speaking country. The largest first-generation immigrant is from Asia (43%), followed by Europe (14%), and Africa (13%). Only 3% are from Australia, New Zealand, Canada, and United States, and 5% from Caribbean; 42% of the second-generation immigrants did not speak English in childhood, whereas 32% of either parent where from a non-English-speaking country.

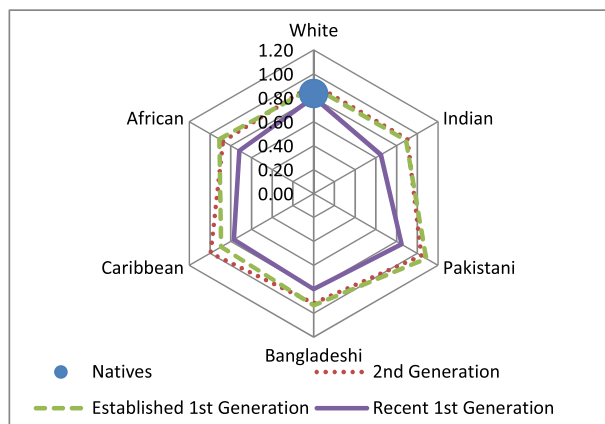
Figures 1–3 graphically represent the mean scores for the three measures (anxiety and depression, social dysfunction, and loss of confidence) by ethnicity and by migrant generation. The score varies from 0 to 3. Lines closer to the centre indicate better levels of mental health. However, as can be seen from the charts, the mean levels observed are always closer to zero than they are to their possible maximum.

Looking across Figures 1–3, two points are apparent. First, recent migrants appear to have a better level of mental health than more established and second-generation migrants. This varies by outcome measure and by ethnic group, but as a broad point, it holds true. Second, on average, Pakistanis appear to have a worse mental health compared with the other ethnic groups.

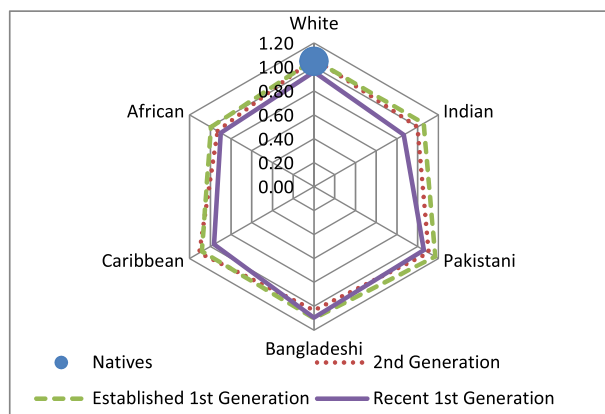
## 4.2 | Regression results

To look deeper into the descriptive findings, we use regression analysis. Including both ethnic group and migrant generation indicators among the regressors allows us to see whether the dimensions have separate independent associations with mental health. Furthermore,





**FIGURE 1** Average anxiety and depression of ethnic group, by generation. The figure plots the average score of anxiety and depression of ethnicity by generation. The lower scores correspond to a better mental health and are represented by the lines closer to the centre. The score ranges between 0 and 3

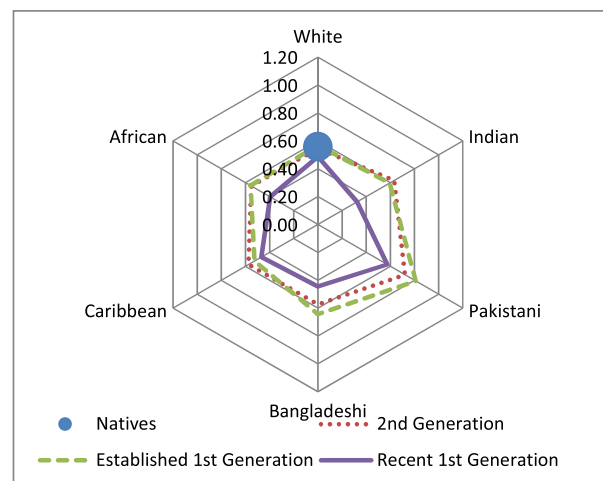


**FIGURE 2** Average social dysfunction of ethnic group, by generation. The figure plots the average score of social dysfunction of ethnicity by generation. The lower scores correspond to a better mental health and are represented by the lines closer to the centre. The score ranges between 0 and 3

the specification allows these two dimensions to interact so the possibility that the variation by ethnic group differs across generations can be captured. We allow for random effects of neighbourhoods and follow Bell (2014) by adopting a simple multilevel model:

$$y_i = \alpha + \sum_g \delta_{eg} E_{ei} G_{gi} + \gamma X_i + \varepsilon_i + u_{LAD} \quad (1)$$

where  $y_i$  are the scores of the measures of mental health;  $E_{ei}$  is an indicator variable taking value 1 when the respondent is a member of ethnic group  $e$  (0 otherwise);  $G_{gi}$  is an indicator variable taking value 1 when the respondent is categorised as being of migrant generation  $g$  (0 otherwise);  $X_i$  includes individual characteristics, specifically age, age squared, and sex; and  $u_{LAD}$  is the Local Authority District random effect. When estimating mental health equations of the type considered here, it is important to recognise the potential for regressors to be endogenous or even dependent on the outcome variable (reverse causality). We are careful to include only exogenous regressors among



**FIGURE 3** Average loss of confidence of ethnic group, by generation. The figure plots the average score of loss of confidence of ethnicity by generation. The lower scores correspond to a better mental health and are represented by the lines closer to the centre. The score ranges between 0 and 3

the  $X_i$  (age and sex) in order to avoid this source of bias. However, we relax this with our final estimates in order to allow some speculation as to the factors that might contribute to differences in mental health.

Because the dependent variables are coded on a point scale, it is a common practice to estimate Equation (1) using an ordered probit. However, given that the marginal effects of the ordered probit are qualitatively similar to the multilevel regression results, in order to facilitate the interpretation of the results, we focus on the multilevel regression estimates. All coefficients are interpreted in comparison with natives.

Before presenting the results, we note that sample sizes are rather small for some combinations of ethnicity and generation. For example, recent first-generation Bangladeshi and Caribbean migrants number are below 100 in our data.<sup>3</sup> Although there is nothing we can do about this, we highlight that findings based on fewer observations are likely to be less reliable. In such cases—and we note that they are the minority—there is a likelihood of low statistical power, raising the risks that possibly, meaningful correlations may not be captured. To explore this whether the results reported here are unduly affected by small sample size, we ran additional estimates using three waves of Understanding Society, thus increasing the number of individuals observed.<sup>4</sup> Results available on request show little change from those reported in this paper in respect of magnitude, direction, or statistical significance.

Tests of the variation by ethnic group and generation (reported in Table A3) point to significant variation by ethnic groups for all migrant generation (except for loss of confidence for second-generation immigrants) even after controlling for age and sex differences. Table 2 shows that many recent first-generation immigrants (specifically Whites, Indians, and Black Africans) have the highest levels of all mental health measures compared with both second-generation and first-generation established immigrants who, on average, experience the worst mental health.

Among established first-generation migrants, it is Pakistanis and Bangladeshis who, across all measures, have the lowest levels of

**TABLE 2** Multilevel regressions of mental health on interacted ethnicity and generation

Variables	Anxiety depression (1)	Social dysfunction (2)	Loss of confidence (3)
White			
2nd generation	0.049 [0.039]	0.008 [0.025]	-0.023 [0.041]
1st generation, established	0.032 [0.030]	-0.006 [0.019]	-0.009 [0.030]
1st generation, recent	-0.063* [0.035]	-0.051** [0.022]	-0.076** [0.038]
Indian			
2nd generation	-0.011 [0.041]	-0.03 [0.030]	0.005 [0.050]
1st generation, established	0.042 [0.034]	0 [0.024]	0.037 [0.036]
1st generation, recent	-0.264*** [0.058]	-0.168*** [0.031]	-0.255*** [0.043]
Pakistani			
2nd generation	0.111** [0.047]	0.069** [0.035]	0.082* [0.046]
1st generation, established	0.177*** [0.052]	0.093*** [0.035]	0.204*** [0.053]
1st generation, recent	0.004 [0.065]	0.022 [0.041]	0.029 [0.064]
Bangladeshi			
2nd generation	0.001 [0.035]	0.012 [0.031]	-0.027 [0.064]
1st generation, established	0.114*** [0.042]	0.059*** [0.021]	0.101** [0.050]
1st generation, recent	-0.043 [0.085]	0.061 [0.067]	-0.056 [0.107]
Black Caribbean			
2nd generation	0.091** [0.039]	0.060* [0.032]	0.012 [0.039]
1st generation, established	0.081 [0.050]	0.029 [0.040]	-0.003 [0.064]
1st generation, recent	-0.103 [0.139]	-0.041 [0.071]	-0.157 [0.156]
Black African			
2nd generation	-0.025 [0.090]	-0.101** [0.049]	-0.054 [0.089]
1st generation, established	0.03 [0.047]	-0.04 [0.029]	-0.007 [0.048]
1st generation, recent	-0.181*** [0.056]	-0.130*** [0.040]	-0.165*** [0.060]
Age	0.010*** [0.001]	0.006*** [0.001]	0 [0.001]
Age squared	-0.015*** [0.001]	-0.006*** [0.001]	-0.003** [0.001]
Female	0.133*** [0.007]	0.063*** [0.005]	0.139*** [0.008]
Constant	0.676*** [0.031]	0.870*** [0.020]	0.573*** [0.032]
Observations	26,855	26,840	26,857
Number of groups	403	403	403
Local authority level error component	0.003 [0.001]	0.001 [0.000]	0.003 [0.001]
Individual level component	0.413 [0.005]	0.167 [0.003]	0.465 [0.007]

Note. Based on Wave 3 of Understanding Society and 2011 Census for the United Kingdom (Office for National Statistics). Robust standard errors in brackets.

\*Significant at 10%.

\*\*Significant at 5%.

\*\*\*Significant at 1%.

mental health. Among second-generation migrants, Pakistanis again experience worse mental health across all measures, whereas Caribbeans experience worse mental health for anxiety and depression and social dysfunction. Among second-generation immigrants, only Black Africans experience lower levels of social dysfunction.

Considering variation by migrant generation, recent Indian migrants have higher levels of mental health for all measures than Indians who have been in the United Kingdom longer. For Whites and Black Africans, recent migrants also have the highest levels of mental health. This highlights the importance of considering multiple indicators of mental health measures.

For Pakistanis, established migrants and those born in the United Kingdom have much lower levels of mental health across the board. Mental illness among second-generation Pakistanis is lower than

White natives, depending on the outcome. Established first-generation Pakistani immigrants have the lowest outcomes and lower than that of natives. The pattern for Black Caribbeans is more mixed.

To explore potential factors driving these results, we augment Equation (1) to include additional variables  $Z_i$ :

$$y_i = \alpha + \sum_g \delta_{eg} E_{ei} G_{gi} + \gamma X_i + \phi Z_i + \varepsilon_i + u_{LAD}. \quad (2)$$

The  $Z_i$  variables include several characteristics that are often thought to influence mental health (partnership status, number of children, employment status, and household income). They also include area characteristics that may capture the extent of social isolation and/or integration: whether the respondent lives in London, the proportion of ethnic minorities in their local area (density), and for non-Whites,



**TABLE 3** Multilevel regressions of mental health on interacted ethnicity and generation, with additional controls

Variables	Anxiety depression (1)	Social dysfunction (2)	Loss of confidence (3)
Density index	0.205*** [0.050]	0.130*** [0.034]	0.183*** [0.051]
Density index interacted with:			
Second-generation White	0.235 [0.246]	0.098 [0.158]	0.069 [0.268]
Second-generation non-White	−0.512*** [0.121]	−0.297*** [0.090]	−0.389*** [0.137]
First-generation established White	0.353** [0.174]	0.221** [0.105]	0.24 [0.165]
First-generation established non-White	−0.159 [0.192]	−0.051 [0.092]	−0.166 [0.195]
First-generation recent White	−0.572*** [0.157]	−0.224* [0.124]	−0.343* [0.202]
First-generation recent non-White	−0.610*** [0.160]	−0.242** [0.098]	−0.218 [0.166]
Concentration index interacted with:			
Second-generation non-White	0.374 [0.292]	0.271 [0.199]	0.217 [0.383]
First-generation established non-White	0.001 [0.279]	−0.061 [0.158]	−0.012 [0.298]
First-generation recent non-White	0.132 [0.429]	−0.064 [0.270]	0.076 [0.403]
Years resident in the United Kingdom— <i>First-generation</i>	0.003** [0.001]	0.001* [0.001]	0.002* [0.001]
Age arrived United Kingdom— <i>First-generation</i>	0.003* [0.002]	0.002** [0.001]	0.002 [0.002]
Sending country— <i>First-generation</i>			
Europe	0.034 [0.051]	0.055* [0.033]	0.063 [0.055]
Asia	−0.018 [0.071]	−0.048 [0.051]	−0.021 [0.076]
Africa	−0.049 [0.056]	−0.053 [0.037]	−0.079 [0.061]
Australia, New Zealand; Canada, and United States	0.059 [0.083]	0.056 [0.058]	0.025 [0.091]
Caribbean	0.14 [0.092]	0.114* [0.064]	0.128 [0.078]
Arrived from non-English-speaking country— <i>First-generation</i>	0.001 [0.045]	0.02 [0.033]	0.023 [0.045]
Arrived as a child and not speaking English— <i>First-generation</i>	0.066 [0.043]	0.054** [0.026]	0.003 [0.043]
Not speaking English in childhood— <i>Second-generation</i>	0.023 [0.037]	0.049* [0.028]	0.051 [0.045]
Either parent arrived from non-English-speaking country— <i>Second-generation</i>	−0.151** [0.066]	−0.06 [0.048]	−0.108* [0.063]
Constant	1.252*** [0.061]	1.200*** [0.038]	1.266*** [0.060]
Observations	26,855	26,840	26,857
Number of groups	403	403	403
Local authority level error component	0.002 [0.001]	0.001 [0.000]	0.002 [0.001]
Individual level component	0.403 [0.005]	0.164 [0.003]	0.448 [0.006]

Note. Based on Wave 3 of Understanding Society and 2011 Census for the United Kingdom (Office for National Statistics). The following variables are not reported: a dummy variable indicator for each ethnic group and being migrants of second-generation, a dummy variable indicator for each ethnic group and being migrants of established first-generation, and a dummy variable indicator for each ethnic group and being migrants of recent first-generation: White second-generation; Indian second-generation; Pakistani second-generation; Bangladeshi second-generation; Black Caribbean second-generation; Black African second-generation; White established; Indian established; Pakistani established; Bangladeshi established; Black Caribbean established; Black African established; White recent; Indian recent; Pakistani recent; Bangladeshi recent; Black Caribbean recent; Black African recent. Additional controls not reported are missing variables indicators, age, age squared, a dummy for gender, a dummy for working, level of education, marital status, number of children, household income, interaction term between concentration index and whether either parent from a non-English-speaking country. Standard errors in brackets are clustered by district.

\*Significant at 10%.

\*\*Significant at 5%.

\*\*\*Significant at 1%.

the proportion of the local population of the respondent's own ethnic group (concentration). We allow the density variable to interact with ethnicity (a White/non-White dummy) and generation dummies and the concentration variable to interact with generation dummies.

We also include variables intended to capture premigration and postmigration experiences that may affect mental health. For first-generation immigrants, we control for years resident in the United Kingdom, age of arrival in the United Kingdom, country of birth, whether from a non-English-speaking country, and whether arrived as a child and spoke non-English in childhood. For second-generation migrant, we control for not speaking English in childhood, whether

either parent arrived from a non-English-speaking country, and an interaction between concentration index and either parent arrived from non-English-speaking country, capturing that migrants are likely to move in areas with of same race/origins/language.

An important caveat is that the modelling approach does not engage with the issue of causality. All the  $Z_i$  variables are potentially endogenous. As such, the regression results permit only a description of the extent to which they are associated with variations in mental health. This is itself useful in a diagnostic sense. We therefore discuss the findings in the context of other results in the literature.

Table 3 shows that living in an ethnically diverse area is associated with lower levels of mental health across all measures. However, this is for the base category of (White) natives; there is considerable variation between immigrant generation and between Whites/non-Whites. Analysing second-generation immigrants, the second-generation non-White benefits outweigh the negative reference group effects, although second-generation Whites are “affected” similarly to native Whites. Considering first-generation immigrants, for established White migrants, anxiety and depression and social dysfunction worsen if living in more diverse areas, whereas for non-Whites, mental health is unrelated to neighbourhood diversity.

For recent immigrants (both White and non-White), living in an area with greater diversity does not damage mental health but is in fact statistically significantly associated with better mental health for all measures, except for non-White loss of confidence that does not have significant effect.

Looking at the concentration index when accounting for different generations, there is no significant association for non-Whites living in areas where their own ethnic group is more strongly represented. Hence, these results provide little support for the finding in psychiatry studies (Shaw et al., 2012) that living in areas with more people of the same ethnicity has a “protective” (i.e., positive) effect on mental health of ethnic minority, due to the enhanced social support and positive identity and higher self-evaluation.

Analysing the migrant-related variables for first-generation, consistent with existing literature, as time spent in the country increases, mental health deteriorates, converging to that of natives. In similar way, age is associated with worse social dysfunction and loss of confidence. This could be due to the fact that older individuals are more likely to have developed stronger social or cultural ties in their country of origin that may make acculturation more difficult compared with those who arrived at younger age.<sup>5</sup>

Considering the heterogeneous group of migrants by country of birth reveals that only European and Caribbean immigrants experience worse social dysfunction and anxiety and depression, respectively.

Arriving from a non-English-speaking country and arriving as a child from a non-English-speaking country do not appear to be drivers of mental health. This may be due to the fact that migrants are on average more educated and more likely to have a good English proficiency, so this does not represent a barrier for first-generation immigrants.

When analysing the migrant-related variables for second-generation, we find that not speaking English in childhood is associated with an increase in social dysfunction and loss of confidence. On the other hand, having either parents arriving from a non-English or English-speaking country relative to parents born in the United Kingdom does not have any effect on mental health.

Understanding the complex mechanisms through which this may occur remains a relevant and open research question.

## 5 | CONCLUSION

In this paper, we use a large and nationally representative survey to examine how mental health varies with ethnicity and family migration history.

We find significant variation across both dimensions. Our results provide an insight into how generations progress, as captured through mental health, varies across ethnic groups. For some ethnic groups (including Whites, Indians, and Black Africans), recent migrants have better mental health than established migrants and those who were born in the United Kingdom. There are two obvious interpretations of this. One possibility is that the higher mental health among the more recent migrants will persist such that, over time, the nature of generational differences will change. The opposite possibility is that individual mental health is dynamic and, over time, will decline among those who are currently recent migrants, leaving the generational profile unchanged.

In attempting to understand the reason behind the observed differences, our results control for a range of additional characteristics. There is a well-established literature on the influences on mental health, and it is possible that the ethnic and generational variations can be accounted for by controlling for these factors. In fact, while doing so does change the findings, it does not account for the variation.

The results are mixed. Mental health of recent non-White migrants is better for those living in areas where their own ethnic group is represented well. The reasons behind these findings are likely to be complex and are perhaps suggestive of the importance of dynamic factors. One interpretation of the results is that the “cushioning” effect of density is important in helping migrants adjust to a new country whereas, in longer term, minorities may have less need for the protective environment of the neighbourhood. Although speculative, such a portrayal highlights the dynamic nature of an adjustment process. Moreover, although not addressed here, another aspect to consider would be how return migration may change the interpretation of the results. Established migrants are net of onward migration and may be compositionally different as a result.

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## CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

## ENDNOTES

- <sup>1</sup> Table A2 presents similar table but by migrant status.
- <sup>2</sup> Variations in age of arrival are observed between established and recent first-generation immigrants: The former arrived on average when they were 21 years old, whereas the latter arrived on average when they were 28 years old. Of the established first-generation immigrants, about 19% arrived before they were 10 years old; this percentage goes down to less than 1% for the recent immigrants.
- <sup>3</sup> Specifically, the sample size of first-generation established migrants is as follows: 654 Whites, 595 Indian, 362 Pakistani, 341 Black Caribbean, and 471 Black African. Of the recent migrants, the sample size is as follows: 335 Whites, 235 Indian, 143 Pakistani, 81 Bangladeshi, 17 Black Caribbean, and 210 Black African.
- <sup>4</sup> Using three waves of Understanding Society, the sample size for recent immigrants increases to 442 and 112 for Bangladeshi and Black Caribbean, respectively.
- <sup>5</sup> Additional estimates have reported cohort of arrivals to consider the different time periods migrants arrived in the United Kingdom and age of arrival in bands to account for different age groups, but no statistical effect was noted.

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## APPENDIX A.

The following table reports the three submeasures and the corresponding General Health Questionnaire (GHQ). The number of the GHQ corresponds to the order of the standard GHQ, as they appear in the Understanding Society. The three submeasures have been created by adding up the corresponding GHQ variables and taking the average.

**TABLE A1** Submeasures of GHQ

Anxiety and depression	2) Have you recently lost much sleep over worry? 5) Have you recently felt constantly under strain? 6) Have you recently felt you could not overcome your difficulties? 9) Have you recently been feeling unhappy or depressed?
Social dysfunction	1) Have you recently been able to concentrate on whatever you are doing? 3) Have you recently felt that you were playing a useful part in things? 4) Have you recently felt capable of making decisions about things? 7) Have you recently been able to enjoy your normal day-to-day activities? 8) Have you recently been able to face up to problems? 12) Been feeling reasonably happy, all things considered?
Loss of confidence	10) Have you recently been losing confidence in yourself? 11) Have you recently been thinking of yourself as a worthless person?

**TABLE A2** Characteristics of individuals by migrant generation

Variable	Natives	2nd generation	1st generation established	1st generation recent
Age	50	36	50	34
Female (%)	56	58	58	53
Partner (%)	80	90	81	94
Working (%)	54	60	48	64
Household income (equivalised) (£)	2,061	1,926	1,800	1,838
London (%)	5	43	47	40
Ethnic group (col %)				
White	100	21	23	34
Indian		21	21	22
Pakistani		22	15	14
Bangladeshi		12	12	8
Black Caribbean		17	12	2
Black African		6	17	20
Education (col %)				
Lower	46	30	26	18
Intermediate	30	38	31	35

(Continues)

**TABLE A2** (Continued)

Variable	Natives	2nd generation	1st generation established	1st generation recent
Higher	24	32	33	47
Number of children (col %)				
None	74	61	58	46
1 child	12	14	14	24
2 or more children	14	26	28	30
Total	24,869	1,571	2,859	1,021

Note. Based on Wave 3 of the U.K. Household Longitudinal Study and Census 2011.

**TABLE A3** The  $p$ -values hypothesis tests (Table 2)

	(1) Anxiety depression	(2) Social dysfunction	(3) Loss of confidence
$p$ -values from hypothesis tests:			
No variation by generation for each ethnic group, $H_0: \delta_{eg} = 0, \forall g$			
Whites	0.1405	0.1246	0.2265
Indian	0.0000	0.0000	0.0000
Pakistani	0.0059	0.0273	0.0017
Bangladeshi	0.0073	0.0403	0.1410
Black Caribbean	0.0220	0.1494	0.7891
Black African	0.0139	0.0032	0.0462
No variation by ethnic group for each generation, $H_0: \delta_{eg} = 0, \forall e$			
2nd generation	0.0399	0.0196	0.5859
1st generation, established	0.0005	0.0071	0.0008
1st generation, recent	0.0000	0.0000	0.0000
No variation by ethnic group or generation $H_0: \delta_{eg} = 0, \forall e, g$	0.0000	0.0000	0.0000